

**AIR MAIL**

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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

**AIR MAIL**

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

**TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371****10/031776**

INTERNATIONAL APPLICATION NO.

INTERNATIONAL FILING DATE

PRIORITY DATE CLAIMED

**PCT/GB00/02656****07/11/2000****08/19/1999**

TITLE OF INVENTION

**Games Grid Board**

APPLICANT(S) FOR DO/EO/US

**Yehouda HARPAZ**

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
  - b. ☒ has been communicated by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
  - a. ☐ is attached hereto.
  - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
  - a. ☒ are attached hereto (required only if not communicated by the International Bureau).
  - b. ☐ have been communicated by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

**Items 11 to 20 below concern document(s) or information included:**

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A **FIRST** preliminary amendment.
14. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☐ Other items or information:

U.S. APPLICATION NO. (if known, see 37 CFR 1.5) <b>10/031776</b>		INTERNATIONAL APPLICATION NO. <b>PCT/GB00/02656</b>		ATTORNEY'S DOCKET NUMBER <b>6</b>	
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<p>21. <input checked="" type="checkbox"/> The following fees are submitted:</p> <p><b>BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):</b></p> <p>Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... <b>\$1040.00</b></p> <p>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... <b>\$890.00</b> ✓</p> <p>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... <b>\$740.00</b></p> <p>International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... <b>\$710.00</b></p> <p>International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) ..... <b>\$100.00</b></p> <p style="text-align: right;"><b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b></p> <p>Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:20%;">CLAIMS</th> <th style="width:20%;">NUMBER FILED</th> <th style="width:20%;">NUMBER EXTRA</th> <th style="width:20%;">RATE</th> <th style="width:20%;">\$</th> </tr> <tr> <td>Total claims</td> <td>- 20 =</td> <td></td> <td>x <b>\$18.00</b></td> <td>\$</td> </tr> <tr> <td>Independent claims</td> <td>- 3 =</td> <td></td> <td>x <b>\$84.00</b></td> <td>\$</td> </tr> <tr> <td colspan="4">MULTIPLE DEPENDENT CLAIM(S) (if applicable)</td> <td>+ <b>\$280.00</b></td> </tr> <tr> <td colspan="4" style="text-align: right;"><b>TOTAL OF ABOVE CALCULATIONS =</b></td> <td>\$ <b>890</b></td> </tr> <tr> <td colspan="4"> <input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.             </td> <td>\$ <b>-445</b></td> </tr> <tr> <td colspan="4" style="text-align: right;"><b>SUBTOTAL =</b></td> <td>\$ <b>445</b></td> </tr> <tr> <td colspan="4">Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).</td> <td>\$</td> </tr> <tr> <td colspan="4" style="text-align: right;"><b>TOTAL NATIONAL FEE =</b></td> <td>\$ <b>445</b></td> </tr> <tr> <td colspan="4">Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). <b>\$40.00</b> per property +</td> <td>\$</td> </tr> <tr> <td colspan="4" style="text-align: right;"><b>TOTAL FEES ENCLOSED =</b></td> <td>\$ <b>445</b></td> </tr> <tr> <td colspan="4"></td> <td>Amount to be refunded: \$</td> </tr> <tr> <td colspan="4"></td> <td>charged: \$</td> </tr> </table> <p>a. <input type="checkbox"/> A check in the amount of \$ _____ to cover the above fees is enclosed.</p> <p>b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. <input type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. _____. A duplicate copy of this sheet is enclosed.</p> <p>d. <input checked="" type="checkbox"/> Fees are to be charged to a credit card. <b>WARNING:</b> Information on this form may become public. <b>Credit card information should not be included on this form.</b> Provide credit card information and authorization on PTO-2038.</p> <p><b>NOTE:</b> Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.</p> <p>SEND ALL CORRESPONDENCE TO:</p> <p style="margin-left: 40px;"><b>Yehouda HARPAZ</b> 129 Corrie Road Cambridge CB1 3QQ UK</p> <div style="text-align: right; margin-top: 20px;"> <p> SIGNATURE</p> <p><b>Yehouda Harpaz</b> NAME</p> <p>REGISTRATION NUMBER _____</p> </div>	CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	\$	Total claims	- 20 =		x <b>\$18.00</b>	\$	Independent claims	- 3 =		x <b>\$84.00</b>	\$	MULTIPLE DEPENDENT CLAIM(S) (if applicable)				+ <b>\$280.00</b>	<b>TOTAL OF ABOVE CALCULATIONS =</b>				\$ <b>890</b>	<input type="checkbox"/> Applicant claims small entity status. 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**Yehouda Harpaz**  
129 Corrie Road  
Cambridge CB1 3QQ  
Phone 01223 873872  
Home Phone 01223 513655  
Email yeh@maldoo.com

December 11, 2001

Dear Sir/Madam,

Attach are forms for entry into the national phase under the PCT, based on application PCT/GB00/02656, including

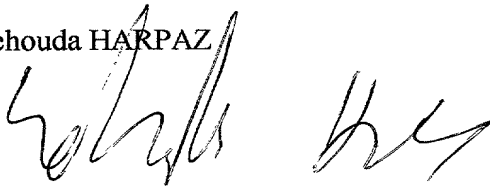
- (1) Transmittal Letter
- (2) Declaration
- (3) Credit card payment.
- (4) Amended claims.

The amended claims are based on the international preliminary examination. They are intended to make the claims clearer, but the contents are essentially the same.

Concerning INFORMATION DISCLOSURE STATEMENT, I am not aware of any document that may affect the patentability of this application, except those that were mentioned in the international search report.

I would be very grateful if you can acknowledge receiving this letter by e-mail to yeh@maldoo.com as soon as it arrive.

Yehouda HARPAZ



10031776-013002

## *Games grid Board*

This invention relates to board games in which a move is done by indicating a point on the board, and the state of the game is expressed in the state of the points. These include traditional games like Go, but also large number of other potential games, puzzles and exercises. The invention presents an electronic board to play these games, and a new kind of game to play on it.

Games like Go are played by each player, in his turn, adding a pebble to the board, on one of the points in a grid of lines drawn on the board, or in one of the squares on the board. These games have the advantages of being based on simple playing acts and being interesting intellectually. Their disadvantages are:

- 1) They require somewhat tricky movement when putting the stone on the board in the right place without disturbing other stones.
- 2) They tend to suffer from delays when a player is thinking on a move.
- 3) Some of the moves require additional 'housekeeping' operations, e.g. taking stones of the board in Go.
- 4) The players need to keep the rules and do the counting of stones themselves, which puts extra demand on the players.
- 5) The stones are separate objects, which are easily lost.

Disadvantages 3-5 can be solved by programming a computer to display the board and stones. The program would be simple enough that it can be put on a small and cheap CPU, and hence be built into a standalone playing board. In principle, the computer could also limit the time allocated to each player, thus solving disadvantage 2.

The problem of input (disadvantage 1), however, is not solved so well by current electronic systems. That is because input for existing electronic systems is normally done through buttons, or other devices, which are separated from the display. For games where there is a small repertoire of possible different inputs this is acceptable, but for board games there are many possible different inputs (the number of points in the grid). Inputting a point on buttons off the display requires the players to perform some mental operation to convert the point they think about to the right input. This is relatively slow and error-prone process. For slow-going games that is very annoying but may be acceptable, but it makes it impossible to play fast on these systems, and for most people this is a decisive factor.

This disadvantage can be overcome by a making a board in which the input and the display are together, and these kind of boards started to appear, at least in the form of patent applications. However, the range of the games that can be played on these board is still limited. The current invention describes such a simple board and a novel games with many interesting variations which can be played on it.

The conceptual structure of the hardware of the board is sketched in Figure 1.

According to the current invention the user accessible part of the board is made of *grid points* 1 & 2 which are arranged in a grid on a flat surface 6. Each grid point is a clearly visible element 1 which can detect when it is pressed, and can be illuminated in at least two colours by an illumination source 2 in or below the surface. The figure shows only 3 grid points for clarity, but the actual board has many more grid points (typically 36 - 1000). The figure also shows the illumination source 2 separately from the visible part of the grid point 1, which denotes the fact that pressing a grid point does not affect its illumination. All the grid points are connected to a *games manager* 3, which is a CPU + memory + software. When a grid point is pressed, the games manager 3 is notified (arrows from the visible part 1 to the games manager 3), and the games manager 3 controls which sources of illumination are on (arrows from the games manager 3 to the sources of illumination 2). The games manager is programmed to manage various games. Managing a game means that the board displays the state of the game by putting on the appropriate sources of illumination 2. When a sensor 1 is pressed, the games manager computes the implication according the rules of the current game, and changes some of the sources of illumination 2 (possibly none) to reflect the new state of the game. The board may also change which sources of illumination are on when no point is pressed. This board can be used to implement many games.

According to the current invention, some of these games are variations of the novel game *Visiput*. The basic rules of *Visiput* are:

Each player in their turn switch on an unilluminated point with their colour by pressing it, provided it is a legal move. A point is a legal move if its 'visibility' for the player is above or equal to some fixed number. The 'visibility' of a point is determined by checking in turn each of a predefined set of imaginary straight lines emanating from the point. If the line does not pass through any illuminated point, it is assigned a value of 0. Otherwise the line is assigned a value of 1 if the closest illuminated point that it passes through is illuminated in the colour of the player, or -1 if it is in the opponent's colour. The sum of the values of the lines is the 'visibility' of the point for the player. The game ends when neither of the players has a legal move, and the player with more points of his/her colour wins.

To allow the users to utilise all the functionality of the board, it will need a control area 4, which allows the players to change the current game, change the rules of the current game and change other parameters, like the length of time that each player has to perform his move. The control area 4 also displays the current score of the game. Typically, the control area will contain few control buttons and an alphanumeric display. The games manager receives information from the control area about which control buttons were pressed, and controls what is displayed in the alphanumeric display.

The basic functionality of the games manager comprises these actions:

- 1) When the users indicate through the control area 4 that they want to change the current game or any of the parameters of the current game, the game manager sets its own internal state to the new value, and indicates to the users the new value.

- 2) When one of the grid points is pressed and the current game and parameters make it illegal for the current player to press some of the points, the games manager checks if the pressed point is allowed according to the rules and parameters of the current game and the current state of the game (i.e. which points are illuminated). If the pressed point is not

allowed, the games board may issue some indication that an illegal point was pressed, may indicate why it is not allowed by some message through the control area 4, and may indicate which points are allowed (e.g. by flashing them). Note that illuminated points, while typically are not allowed, may be allowed in some games .

3) When a point is pressed and it is allowed according to the current rules, parameters and state of the game, the games manager computes the implications and then changes the illumination of some (possibly zero) points to reflect the new state of the game. Note that:

- a) While typically the point that is pressed changes its illumination, this is not mandatory.
- b) Other points except the pressed point may change as well.

4) If the rules of the current game require it, the games manager changes the illumination of some points even when none of the points is pressed, typically once each some time period (or 'generation').

5) After each change to the illumination of any grid point, the games manager computes the current score and displays it using the control area 4.

6) After each change to the illumination of any grid point, the games manager checks, using a game-specific routine, if the game is finished. If the game is finished, the games manager indicates it, typically by some message in the control area 4, and maybe other additional signals.

The board will also need a way to signal whose turn it is, which would typically be done by two *turn lights* 5, which are in two separate colours, corresponding to two of the colours of the illumination in the grid points. The games manager controls these turn lights, and signal to the players whose turn it is by switching the corresponding turn light.

The arrangement of the grid points would be in most cases square as in Figures 3 and 4, but can also be of different shapes (e.g. rectangular, hexagonal (as shown in Figure 5), triangular or less regular). The overall shape of the board would typically be square, but can also vary.

The kind of games that the board will be programmed to play include (but not restricted to):

- 1) Traditional two-person games like Go, where each player is associated with one colour.
- 2) Novel two-person games like the one described in this invention.
- 3) Puzzles and single-player games.
- 4) *Fluid games*, which means games where the patterns of illuminated points changes even when the player(s) don't press any point.
- 5) Memory games.

The game *Visiput* :

As is clear from the description of *Visiput* on p.2, the central concept of *Visiput* is the 'visibility' of a point. Figure 4 demonstrates the calculation of 'visibility' in a square grid where the pre-defined set of imaginary lines is the 8 lines emanating from the point going

through the closest 8 points. The circles represent grid points, hollow squares represent points that are illuminated with the player's colour, pluses represent points that are illuminated with the opponent's colour. The arrows emanating from few of the points mark the imaginary lines that are used to compute the 'visibility' for these points. For point 15, three of the lines (left, left-bottom, right-bottom) do not pass through illuminated points, and hence have the value 0. Of the rest of the lines, for three lines (top, top-left, right) the closest illuminated point is in the player's colour, so have the value 1, and for 2 lines (bottom and top-right) the closest illuminated point is in the opponent's colour, so they have the value -1. Summing this eight values gives point 15 'visibility' of 1 for the player.

For points on the border of the grid, some of the lines have always a value of 0. For example, for point 16 the three top-lines are always 0. The left line also has the value 0. The bottom-left, bottom and right lines have value 1, the bottom-right line has value -1, and the total 'visibility' is 2. Similarly, point 17 has 5 lines which are always 0.

As the examples demonstrate, the 'visibility' of a point for a player is potentially dependent on the status of points that are very far away. In addition, the 'visibility' of a point is a dynamic state and changes many times as the game progresses. In general, every move can change the 'visibility' of many points, because each point is on the imaginary lines emanating from many points. For example, if the player plays in point 18 in Figure 4, it will increase by 2 the 'visibility' of all the points on the line from point 18 to point 15 and continuing to the end of the board, because for each of these points one of the imaginary lines goes through point 18 and has value -1, and this line will change its value to 1 once the player switches on point 18. On the other hand, this move will not affect the 'visibility' of point 16 and the points between them, because the line from point 16 to point 18 has already a value of 1. If the player plays in point 15, it will increase by 1 the 'visibility' of all the points on the line from point 15 to point 18 and continuing to point 19, because the line from all of these points through point 15 currently has the value 0, and when the player plays in point 15 the value changes to 1.

Figure 5 (same notation as Figure 4) demonstrates the calculation of 'visibility' in an hexagonal arrangement, with the pre-defined set of imaginary lines being the 6 lines through the 6 closest points. For point 20, the value of the lines left, bottom-left and top-right is 1, top-left and right is -1, bottom-right 0, and the total 'visibility' is 1. For point 21, left is 1, top-left and bottom-right are -1, the rest are 0, and the total is -1.

By definition, when the value of a line is 1 for one player, it is -1 for the other player. Therefore the 'visibility' of each point for one player is the negative value of its 'visibility' for the opponent. Since points are legal moves for a player only if its 'visibility' for this player is bigger than or equal to some fixed value, a player can prevent his opponent's from playing in a point by increasing its 'visibility' for himself, and hence decreasing the 'visibility' for the opponent. To win, a player needs to prevent his/her opponent from playing in as many points as possible, while at the same time ensuring that the opponent does not prevent him/her from playing in many points. Because of the long range of 'visibility' and its dynamic nature, *Visiput* requires a long-term planning and manoeuvres which are coordinated across the whole board, and has a considerable strategic depth.

A specific embodiment of the invention will now be described with reference to the accompanying drawings:

Figure 1 shows the conceptual structure of the board.

Figure 2 shows a sketch of the electronic components of an example board.

Figure 3 is a sketch of the way the board looks for players from above.

The inputs of grid points 1 are implemented by a custom-design membrane keyboard 7 on a PCB 6, which together comprise the top of a flat rectangular box. The membrane keyboard contains a grid of 9x9 translucent buttons 1, which are in a shape of small domes. Between the buttons the membrane is painted with lines 8 drawn on the imaginary lines connecting the centres of the buttons. The PCB 6 has holes below each button, with additional holes 9 for the turn lights. Both the PCB 6 and the membrane keyboard 7 has a hole for the alphanumeric display 11.

The illumination of the grid points is implemented by 9x9 pairs of LEDs 2 mounted on a PCB 12, which is itself mounted below the membrane keyboard such that each LEDs pair 2 is under the centre of one of the buttons 1. In each pair one LED is of one colour (e.g. green) and the other of another colour (e.g. red). Alternatively, each LEDs pair can be replaced by a bi-colour LED. The two turn lights 5 are implemented by two large LEDs, one in one of the colours of the pairs of LEDs 2, and one in the other colour, mounted on PCB 12 as the rest of the LEDs. The electronic circuitry to drive the LEDs 2 and the turn lights 5 is also on PCB 12.

The membrane keyboard 7 also contains several control buttons 10, which allow the users to control the game (start, stop etc.) and to select which game is played and set parameters for the current game. An alphanumeric display 11 is mounted in a hole in the membrane keyboard 7. The control buttons 10 and the display 11 together comprise the control area 4 of Figure 1.

All the input from the membrane keyboard goes to the games manager 3, which is a small CPU (around 5MIPS) and a little ROM and RAM (around 32Kb and 6 Kb respectively). The games manager 3 is placed below the LEDs PCB 12. A custom design electronic circuitry (denoted by arrows from the membrane keyboard 7 to the games manager 3, and from the games manager 3 to the PCB 12 and to the display 11) allows the games manager 3 to switch on and off each individual LEDs, and to display the appropriate information in the alphanumeric display.

Figure 3 shows a sketch of the board from above in a middle of a game, with some grid points illuminated. Most of the grid points are not illuminated (circles with points). Some of the points are illuminated in one of two colours (indicated in the figure by two different shading). Because the buttons are translucent (rather than transparent), the LEDs 2 are not actually visible.

The embodiment of the grid points which is described above seems to be the most effective with current technology, but some parts can easily be changed if and when other technologies improve or new technologies become available, without affecting the overall design of the board. The detection of pressing a grid point may be done by any discrete



input device, for example standard contact switch and capacitive switch. The illumination of the grid points can be done by other kind of sources, for example gas-discharge lamps and incandescent lamps.

In the embodiment which was described above the players press the grid points with their fingers. This is very convenient, which is one of the advantages of the board. However, it has a problem that the board cannot distinguish which player is pressing a point, so the players can press a point out of their turn. The possible solutions to this problem seem to be too cumbersome and in some cases too expensive, so they are not included in the preferred embodiment. However, some of the solutions may prove to be convenient and cheap enough to be acceptable, and if the board is used for formal tournaments it may become an essential requirement.

A cheap and simple solution is to add two buttons on two sides of the board, one for each player, and the player will need to either hold down his own button while pressing a point or to first press his button and then press the point.

Another solution is to have two probes connected to the board, and the players use them to press the points. The contact between the probe and the board creates a short circuit which the board detects and hence can tell which probe, and hence which player, presses the point. An advantage of this solution is that it means that the sensor in each grid point can be a simple conducting element, instead of the membrane keyboard which is described above, which may make the board actually cheaper. Alternatively this method can be used to detect which player presses a point, in combination with another method to detect which point is pressed. For example, a membrane keyboard can be coated with a conducting layer, and the short circuit is caused when the probe touches this layer. In this case the membrane keyboard will detect which point is pressed, and the short circuit detects which player presses it.

Another variation of this solution is that the board emits some signal (electromagnetic or maybe ultrasound), and the probe detects this signal, and the probe that detects the signal more strongly is the one that actually presses. In this case the probe does not need to touch the board, so may be worn by the players, rather than held, which is more convenient. Another variation is that the probe interferes with or reflects the signal, and the board uses this response to detect which player presses the board. In this case, the probe does not need to be connected to the board. Alternatively, the probes themselves may emit different signals.

The solution above requires the players to hold or wear an object, which is uncomfortable. A possible solution is to mark the fingers of the players, by some material that adhere to the skin, and that the board can detect. Even more advanced technology may be able to recognise the fingers of the players directly.

## The software:

The central loop of the software repeats these four steps:

- 1) Check if any of the control buttons was pressed. If any control button was pressed, perform the appropriate operation (change the game, set a parameter, stop the game, start the game).
- 2) Check if any of the grid points was pressed. If so, compute the implications according to the rules of the current game, perform all the changes to the board, and then switch the turn to the other player. Switching the turn means switching the turn light of the current player off, setting the internal variable *current\_player* to the other player, switching the turn light of the other player on and setting a variable, the *turn end mark*, to the current time plus the turn time.
- 3) Check the clock and compare it to various time marks. A time mark is a variable set to some value, which is compared to the current time. The most important is the turn end mark, and if this is passed, switch the turn as in 2. Other time marks are for updates of the displays.
- 4) Check if there are game specific operations to perform. If a player plays one of the two-players games against the board, this check perform the board's move.

### Managing *Visiput*:

The example board has these settable parameters for the game *Visiput*:

- 1) number of points that should be switched on when the game starts. If this is 0, the game starts with a standard configuration of illumination. Otherwise it starts with half of the specified number points illuminated in each colour, in random locations.
- 2) The minimum 'visibility' for a point to be a legal move. This parameter ranges from -2 to 2, and defaults to 0.

When a player presses a point, the games manager traces all the lines from this point to check its 'visibility' for the player, and if this is too low rejects the move, and then marks all the legal moves for this player. This feature is quite important, because working out if a point is legal is not a simple task, and players can easily get it wrong. If the move is legal, the game manager switches the point on with the player's colour. It then check if all the empty point are already 'decided', where a 'decided' point is a point that is an illegal move for one player or for both, and no legal move can change it. If all the points are decided, the games manager switches all the 'decided' points where one player can play to this player's colour and finishes the game. This save the players this part of the game, which has no interest because no move can change the result.

## CLAIMS

## 1 An electronic board comprising:

a grid of *grid points* on a flat surface, where each *grid point* is a visible element which is capable of detecting when it is pressed, and can be illuminated in two different colours, allocated to respective players, by an illumination source inside or below the surface; and

a *game manager* made of

a CPU and memory, connected electronically to the grid points and illumination sources such that it has complete control on which grid point is illuminated and in what colour, and it is notified whenever any of the grid points is pressed, and a computer program which is executed by the CPU,

which manages a one or more games, of which at least one game is played according to these rules:

Each player in their turn switch on an unilluminated point with their colour by pressing it, provided it is a legal move;

the legality of a point for a player is evaluated by checking in turn each of a pre-defined set of imaginary straight lines emanating from the point, assigning a value of 0 to each of these lines that does not pass through an illuminated point, a value of 1 if the closest illuminated point that it passes through is illuminated with the colour of the player, and -1 if it is in the opponent's colour, then comparing the sum of the values of all the lines to a fixed number, and if the sum is larger or equal the point is a legal move for the player;

the game ends when neither of the players has a legal move, and the player with more points of his/her colour wins.

- 2 A board as described in Claim 1, where the arrangement of the points is square.
- 3 A board as described in Claim 2, where the set of virtual lines is the 8 lines emanating from the point and going through the closest 8 points.
- 4 A board as described in Claim 1, where the arrangement of the points is hexagonal.
- 5 A board as described in any preceding claim, where the fixed number which is used in determining the legality of a move is 0.
- 6 A board as described in any preceding claim, where pressing a point is done by special implement that causes a short circuit which the board uses to identify the point that is pressed.
- 7 A board as described in any preceding claim, where the players use, hold or wear a special implement which identifies which player is playing by communicating with the board.

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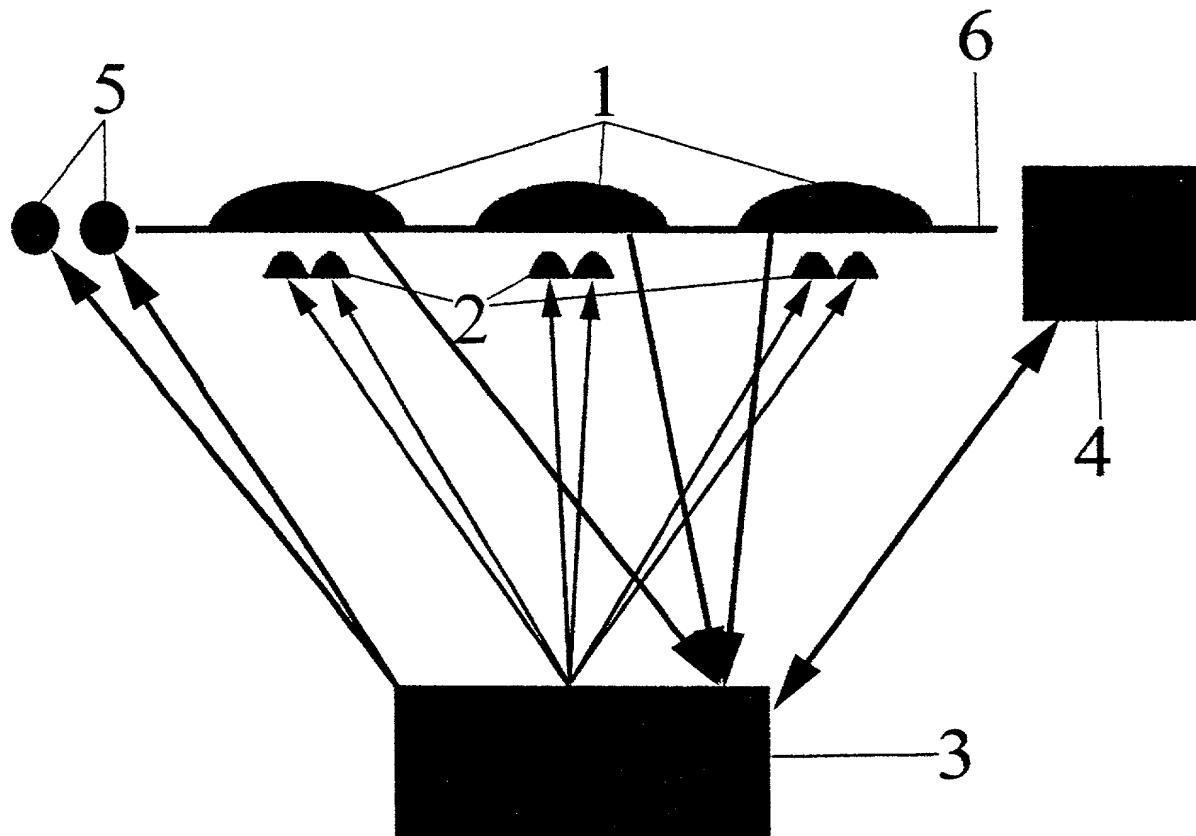


Fig 1

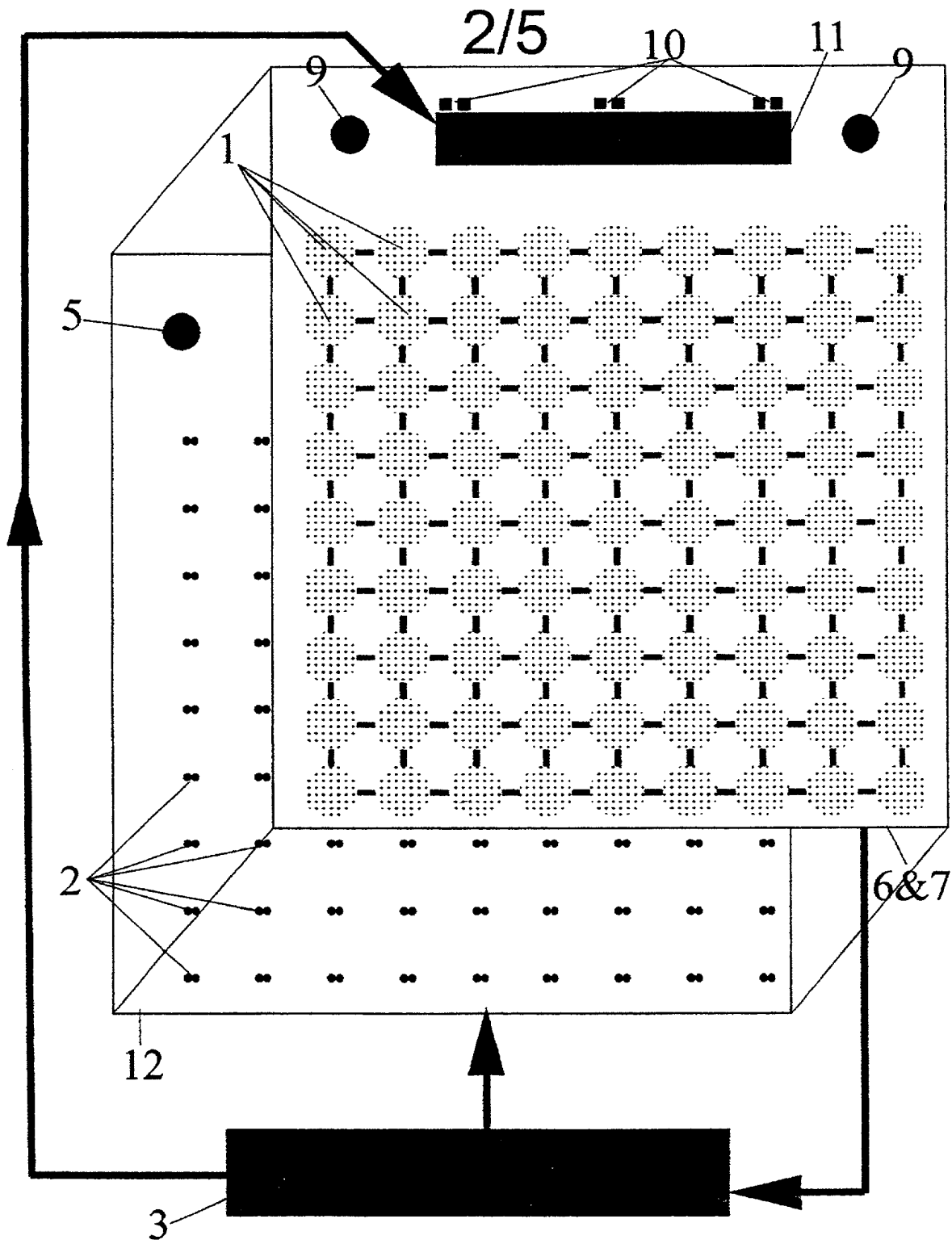


Fig 2

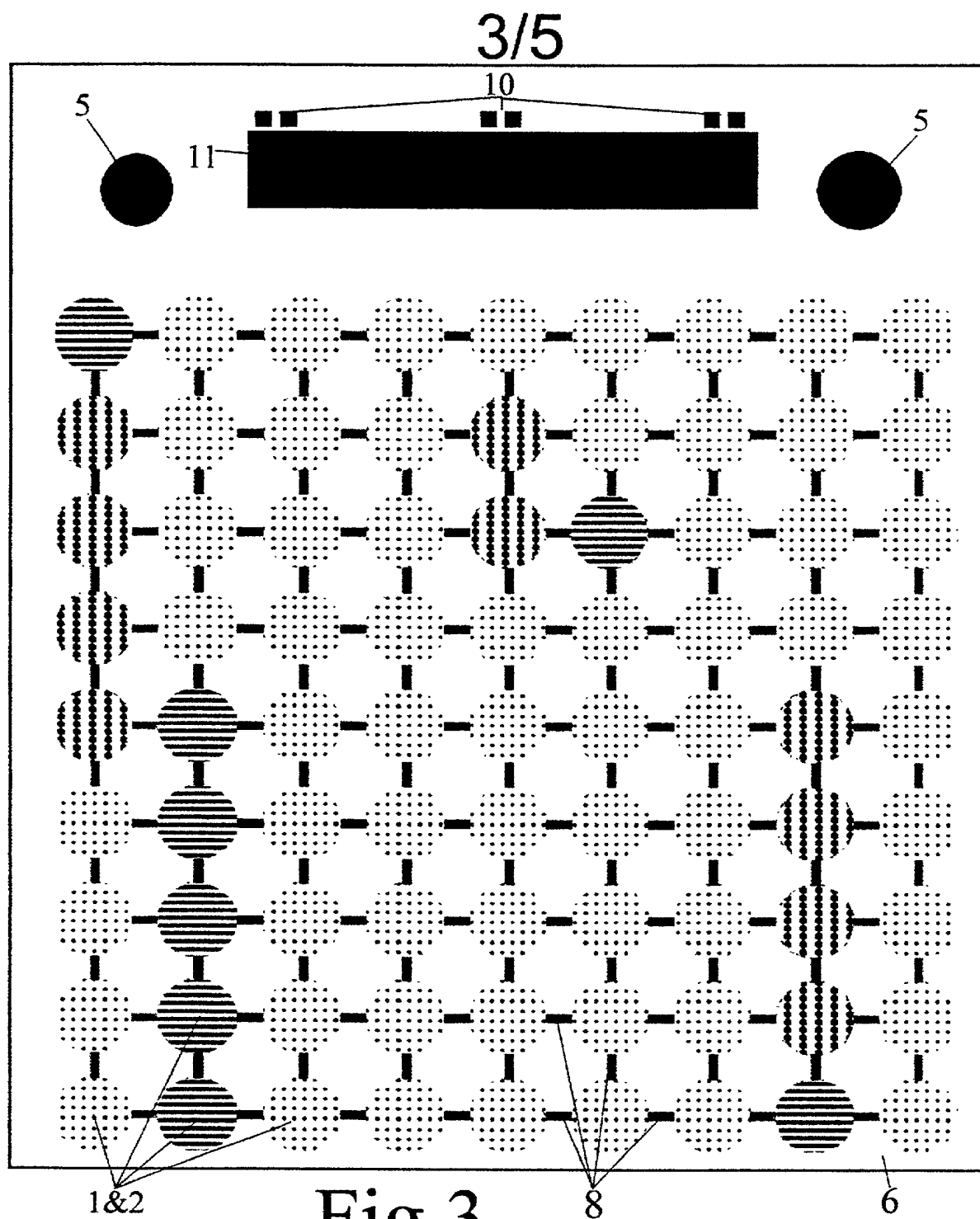
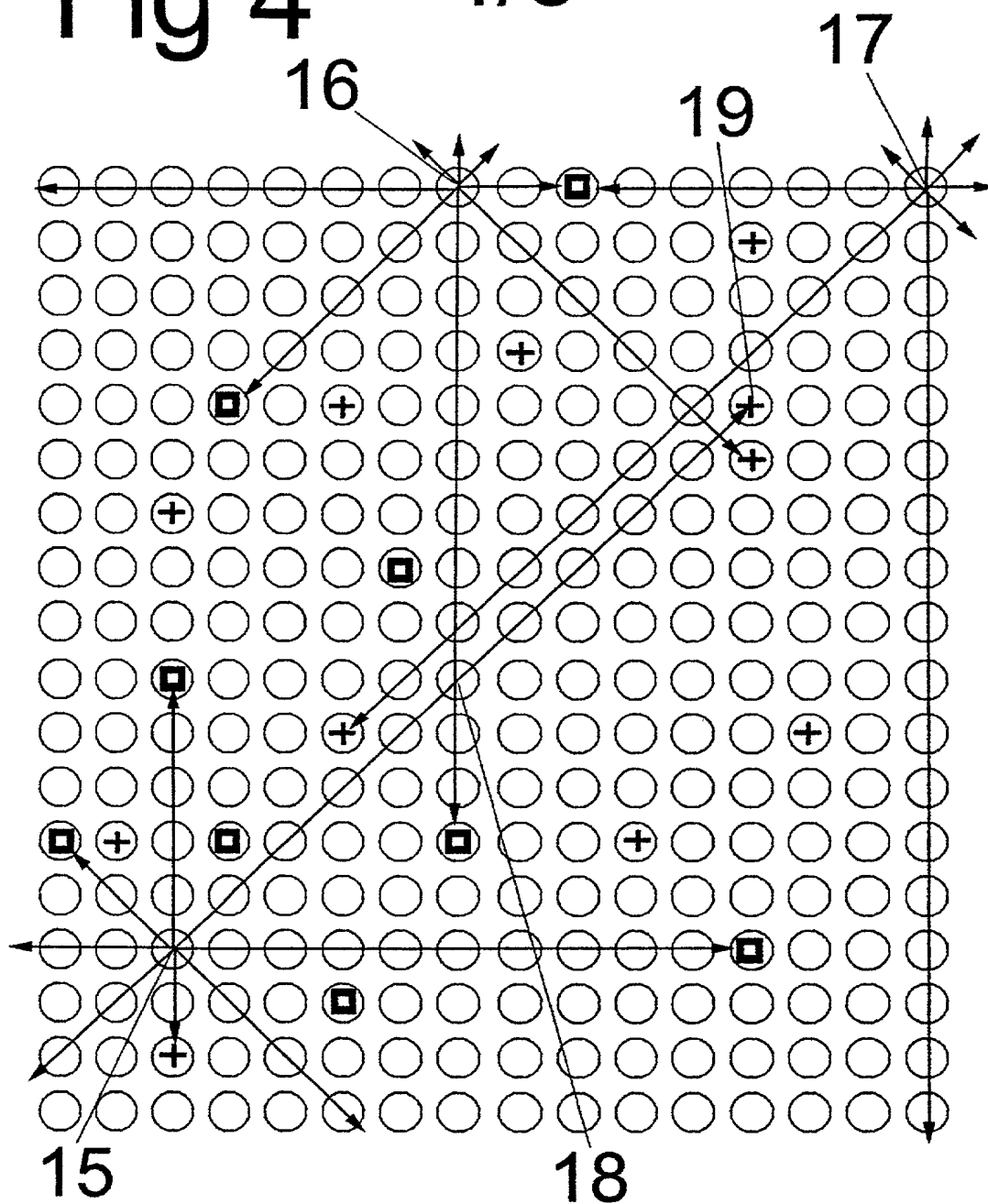


Fig 3

# Fig 4

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**DECLARATION FOR UTILITY OR  
DESIGN  
PATENT APPLICATION  
(37 CFR 1.63)**

☒ Declaration Submitted with Initial Filing      OR      ☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number

First Named Inventor

Yehouda HARPAZ

**COMPLETE IF KNOWN**

Application Number

Filing Date

Art Unit

Examiner Name

As the below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original and first inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Games Grid Board ✓

(Title of the Invention)

the specification of which

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY)

07/11/2000 ✓

as United States Application Number or PCT International

Application Number **PCT/GB00/02656** and was amended on (MM/DD/YYYY) (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

[Page 1 of 2]

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Name

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR : ☐ A petition has been filed for this unsigned inventorGiven Name Yehouda  
(first and middle [if any])Family Name HARPAZ  
or SurnameInventor's  
Signature *Yehouda Harpaz*

Date

12/12/2001City CambridgeCountry UKCitizenship ✓

Residence: City

State

Country

Citizenship

129 Corrie Road

Mailing Address

City Cambridge

State

CB1 3QQ

ZIP

Country UK

Citizenship

NAME OF SECOND INVENTOR: ☐ A petition has been filed for this unsigned inventorGiven Name  
(first and middle [if any])Family Name  
or SurnameInventor's  
Signature

Date

Residence: City

State

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☐ Additional inventors are being named on the \_\_\_\_\_ supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.